

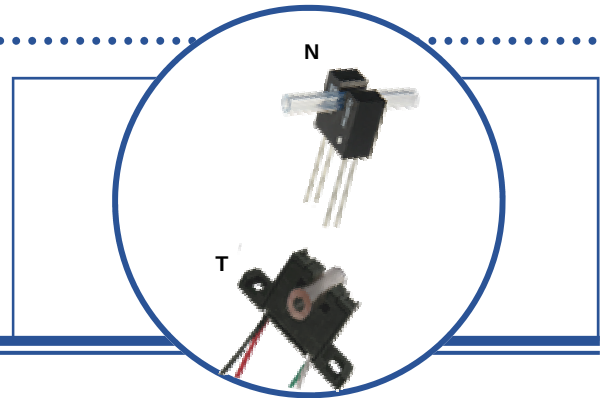
Tube Liquid Sensor

OPB350 Series



Features:

- Can identify if liquid is present in clear tubes that have a 1/8" (3.175 mm), 3/16" (4.763) or 1/4" (6.350 mm) outside diameter
- Opaque plastic housing enhances ambient light rejection
- Printed circuit board mounting or 24" (609.600 mm) wires



Description:

The **OPB350** series liquid sensor is designed to work with 1/8", 3/16" and 1/4" outside diameter clear tubes. When output reference circuitry is added, multiple output states such as "fluid present," "no fluid present" and "no tube present" can be recognized.

Clear liquid present causes the phototransistor to sink the maximum current, while dark liquid present causes it to sink the minimum current. As bubbles pass through the tube, the signal will vary between the "liquid present" and "no liquid" states. If no liquid is present, the phototransistor sinks only a small amount of current. If no tube is present, the phototransistor sinks a larger current than in the "no liquid" state.

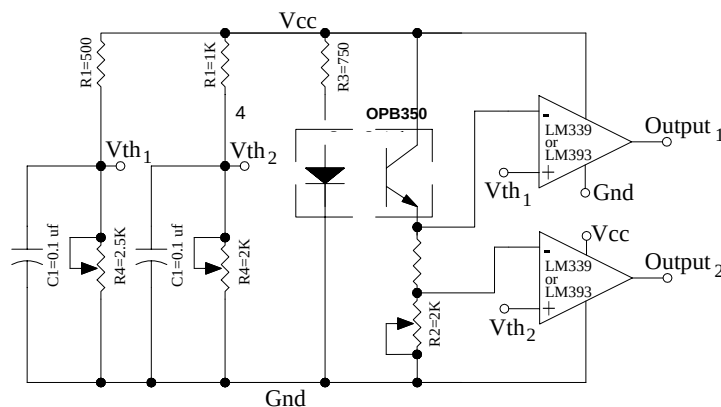
Smaller outside diameter tubes can be used when the tube is sized up to one of the standard sizes and is fitted properly in the housing opening. For example, fluid in a 1/16" outside diameter tube can be sensed when a piece of tubing with a 1/8" outside diameter and a 1/16" inside diameter is used as an adapter.

Applications:

- Non-contact fluid sensing
- IV fluid
- Oils and other petroleum products
- Colored fluids
- Toner fluids
- Water

Ordering Information			
Part Number	Tube Size O.D.	Part #	Package Type
OPB350	1/8"	PCBoard Mount	N
OPB350L187	3/16"	PCBoard Mount	N
OPB350W187	3/16"	24", 26 AWG, Wire	T
OPB350L250	1/4"	PCBoard Mount	N
OPB350W250	1/4"	24", 26 AWG, Wire	T

Typical Application Circuit



"N" Package Only



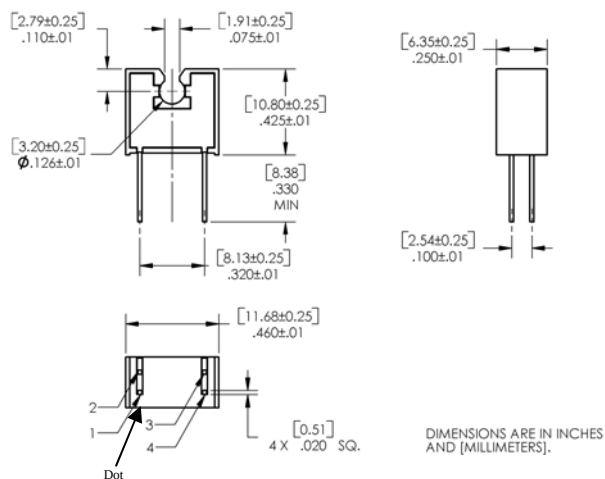
RoHS

OPTEK reserves the right to make changes at any time in order to improve design and to supply the best product possible.

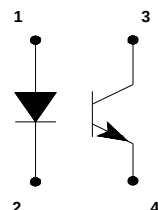
Tube Liquid Sensor OPB350 Series



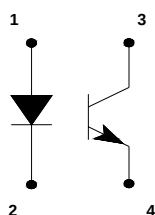
OPB350



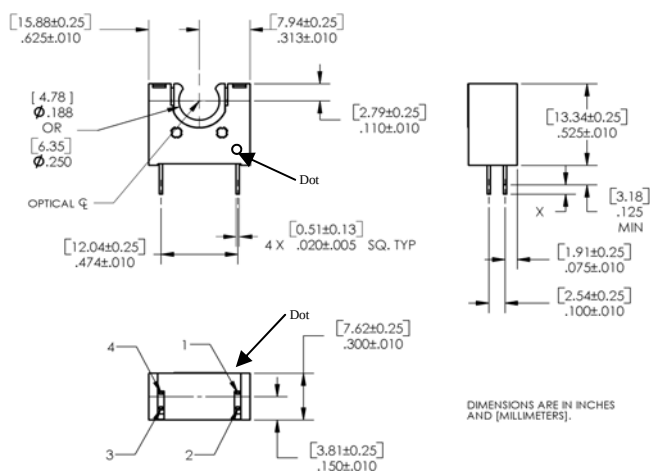
Pin #	LED	Pin #	Transistor
1	Anode	3	Collector
2	Cathode	4	Emitter



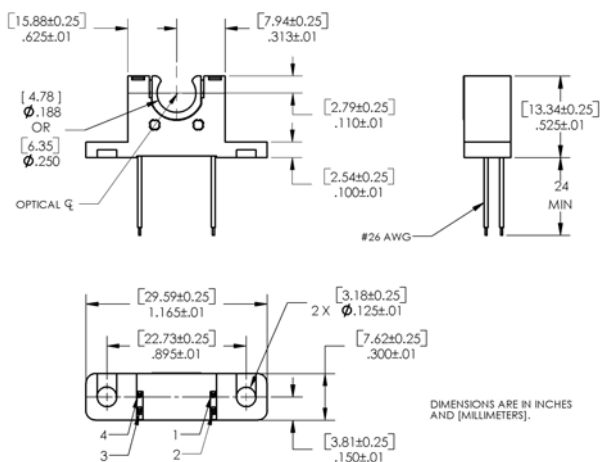
Pin #	LED	Pin #	Transistor
1	Anode	3	Collector
2	Cathode	4	Emitter



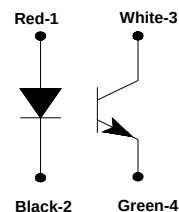
OPB350L187 and OPB350L250



OPB350W187 and OPB350W250



Pin #	LED	Pin #	Transistor
Red	Anode	White	Collector
Black	Cathode	Green	Emitter



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Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Storage Temperature	-40° C to +100° C
Operating Temperature	-40° C to +85° C
Lead Soldering Temperature [1/16 inch (1.6mm) from the case for 5 sec. with soldering iron]	260° C ⁽²⁾

LED

Forward DC Current	50 mA
Peak Forward Current (2 μs pulse width, 0.1% duty cycle)	1 A
Reverse DC Voltage	2 V
Power Dissipation	100 mW

Output Phototransistor

Collector-Emitter Voltage	25 or 30 V
Collector DC Current	50 mA
Power Dissipation	100 mW

Electrical Characteristics ($T_A = 25^{\circ}\text{C}$ unless otherwise noted)

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
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Input LED (See OPB245 for additional information — for reference only)

V_F	Forward Voltage	-	-	1.8	V	$I_F = 20 \text{ mA}$
I_R	Reverse Current	-	-	100	μA	$V_R = 2.0 \text{ V}$

Output Phototransistor (See OPB555 [PB350] & OP750 [-187 & -250] for additional information — for reference only)

$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	OPB350 -187 & -250	30 25	- -	- -	V	$I_C = 100 \mu\text{A}$, $E_E = 0 \text{ mw/cm}^2$
I_{CEO}	Collector-Emitter Dark Current		-	-	100	nA	$V_{CE} = 10 \text{ V}$, $I_F = 0$, $E_E = 0 \text{ mw/cm}^2$

Coupled (Tested using clear 0.125" O.D., 0.062 I.D. nylon tubing)

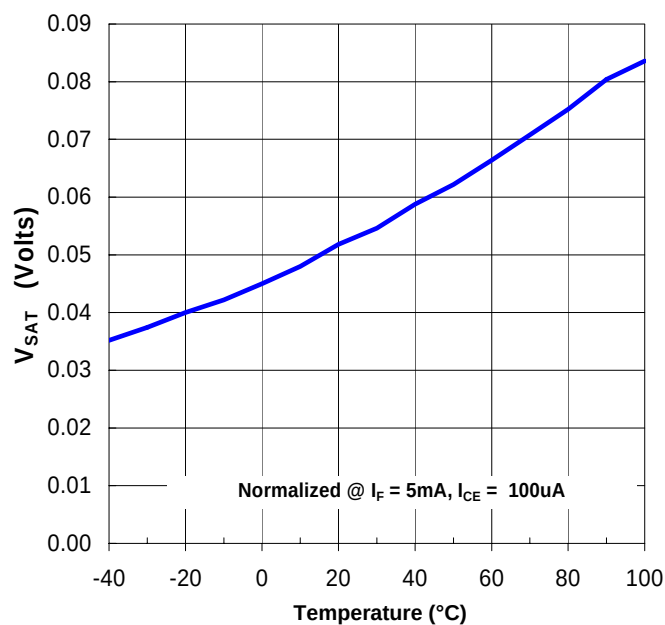
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	-	-	0.4	V	$I_C = 100 \mu\text{A}$, $I_F = 5 \text{ mA}$
$I_{C(ON)}$	On-State Collector Current					
	OPB350	1	3.5	6	mA	$V_{CE} = 0.4 \text{ V}$, $I_F = 5 \text{ mA}$
	OPB350L187 & OPB350W187	1	2	4	mA	$V_{CE} = 0.4 \text{ V}$, $I_F = 5 \text{ mA}$
	OPB350L250 & OPB350W250	0.75	1.5	3	mA	$V_{CE} = 0.4 \text{ V}$, $I_F = 5 \text{ mA}$
On/Off Ratio	OPB350	-	3	-	-	$V_{CE} = 0.4 \text{ V}$, $I_F = 5 \text{ mA}$, I.D.=0.0625"
	OPB350L187 & OPB350W187	-	2.3	-	-	$V_{CE} = 0.4 \text{ V}$, $I_F = 5 \text{ mA}$, I.D.=0.0870"
	OPB350L250 & OPB350W250	-	2.3	-	-	$V_{CE} = 0.4 \text{ V}$, $I_F = 5 \text{ mA}$, I.D.=0.1250"

Notes:

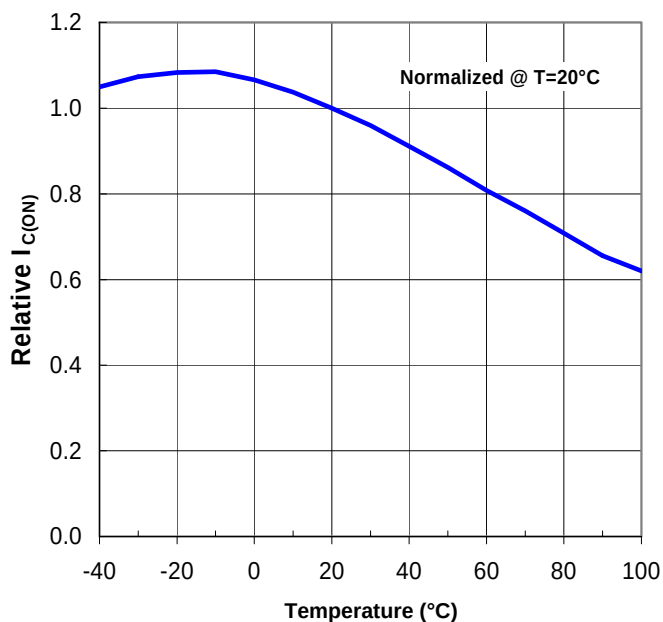
- (1) All parameters tested using pulse technique.
- (2) RMA flux is recommended. Duration can be extended to 10 seconds maximum when flow soldering.
- (3) Methanol or isopropanol are recommended as cleaning agents. The plastic housing is soluble in chlorinated hydrocarbons and ketones.
- (4) Derate linearly 1.33 mW/° C above 25° C.
- (5) $E_{e(APT)}$ is a measurement of the average apertured radiant energy incident upon a sensing area 0.250" (6.350 mm) in diameter, which is perpendicular to and centered to the mechanical axis of the emitting surface at a distance of 0.466" (11.837 mm). $E_{e(APT)}$ is not necessarily uniform within the measured area.

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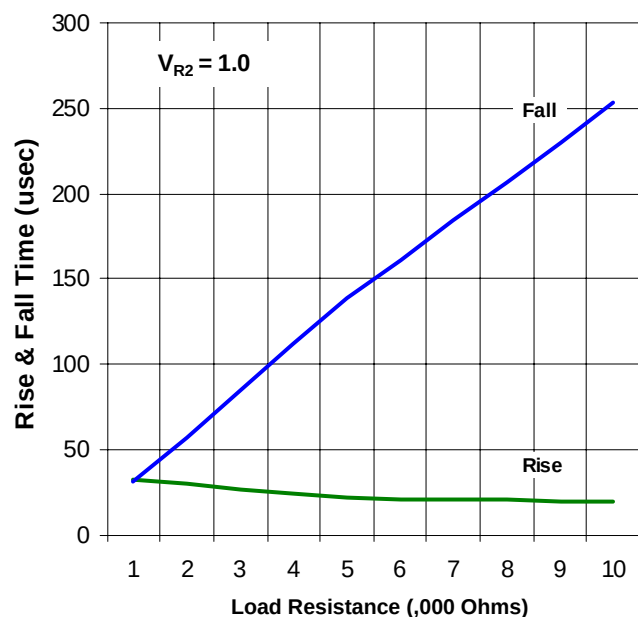
Typical V_{SAT} vs Temperature



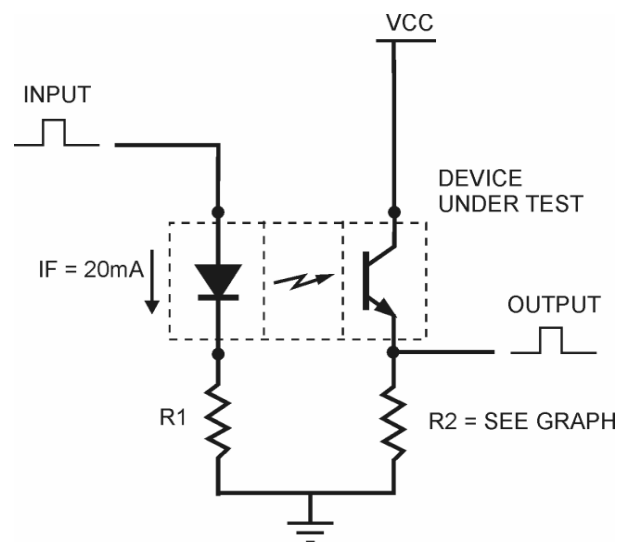
Normalized $I_{C(ON)}$ vs Temperature



Rise & Fall Time vs Load Resistance



Test Circuit (Rise & Fall Time)



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